



FAA-C-2617  
March 30, 1976

AMENDMENT 1

## DEPARTMENT OF TRANSPORTATION

### FEDERAL AVIATION ADMINISTRATION

### SPECIFICATION

#### CONSTRUCTION OF VISUAL APPROACH SLOPE INDICATOR (VASI)

This amendment forms a part of FAA-C-2617, dated March 14, 1975.

Page 3, paragraph 2-2.- Delete the paragraph in its entirety and substitute new paragraph as follows:

Backfill.- Backfilling shall not begin until construction below finish grade has been approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to finish grade. Backfill material adjacent to foundation walls or piers shall be deposited in 6-inch maximum thickness layers, properly moistened and thoroughly consolidated by power operated mechanical equipment to 90% maximum density at optimum moisture content in accordance with AASHTO-T99. Backfill material shall be clean earth, free from perishable material and debris. Backfill shall not be placed around foundation walls or piers prior to seven days after their completion.

Page 4, paragraph 3-3.3.- In line 1, after "metal", add "fiber tube".

Page 6, paragraph 3-7.5.- In line 2, delete "Chapter 6 of" and substitute "provisions in".

Page 9, paragraph 13-1.1-b.- Delete abbreviation "EMT" in second line and substitute "electric metallic tubing (EMT)".

Page 9, paragraph 13-2, 13-2.1 and 13-2.2.- Delete and substitute the following:

13-2 VASI power and control assembly.

13-2.1 General.- The power and control assembly shall be mounted on two inch EMT on two frangible couplings connected to two inch conduit installed in two concrete piers behind a VASI lamp housing assembly. The power and control assembly is installed with the door opening away from the lamp housing assembly and at a height sufficient to prevent the door striking the ground.

13-2.2 Power and control assembly input power.- The 120/240 volt, 3 wire, single phase, 60 hertz power, input is supplied through the power and control assembly entrance closest to the runway. The wire size shall be as specified on the installation drawings.

13-2.3 Power and control assembly output.- Install the output cables to the lamp housing assembly through a two inch conduit or a cable squeeze bushing. The output cables from the power and control assembly are installed in the support leg furthest from the runway for all lamp housings except the adjacent housing. The lamp housing assembly adjacent to the power and control assembly is supplied by a cable installed through the squeeze fitting on the output side the power and control assembly.

13-2.4 VASI-6 Control interconnection.- When the contract is to install a 6-box VASI with two power and control assemblies the contractor shall install interconnecting control wires and associated relay as described on the installation drawings. The interconnecting control wire provides for photoelectric control from only one photoelectric sensor. The contractor shall make wire installation and terminations in the power and control assembly, as required by the installation drawings to provide a functioning interlock.

\* \* \* \* \*



FAA-C-2617  
March 14, 1975  
Reprinted 7/23/80

# **DEPARTMENT OF TRANSPORTATION**

## **FEDERAL AVIATION ADMINISTRATION**

### **SPECIFICATION**

CONSTRUCTION OF VISUAL APPROACH SLOPE INDICATOR  
(VASI)

TABLE OF CONTENTS

DIVISION 1. GENERAL REQUIREMENTS		Page 1
Section 1-1	Summary of Work	
Section 1-2	General Requirements	
DIVISION 2. SITE WORK		Page 3
Section 2-1	Excavation	
Section 2-2	Backfill	
Section 2-3	Aggregate for Fill and Walkways	
Section 2-4	Reconditioned Surface	
DIVISION 3. CONCRETE		Page 4
Section 3-1	General	
Section 3-2	Applicable Documents	
Section 3-3	Materials	
Section 3-4	Samples and Testing	
Section 3-5	Forms	
Section 3-6	Reinforcing Steel	
Section 3-7	Concrete	
DIVISION 4. MASONRY		
	Not Used	
DIVISION 5. MISCELLANEOUS METALWORK		Page 8
Section 5-1	General	
Section 5-2	Applicable Document	
Section 5-3	Materials	
Section 5-4	Workmanship	

DIVISION 6. CARPENTRY

Not Used

DIVISION 7. MOISTURE PROTECTION

Not Used

DIVISION 8. DOORS WINDOWS AND GLASS

Not Used

DIVISION 9. FINISHES

Not Used

DIVISION 10. SPECIALITIES

Not Used

DIVISION 11. EQUIPMENT

Not Used

DIVISION 12. FURNISHINGS

Not Used

DIVISION 13. SPECIAL CONSTRUCTION

Page 9

Section 13-1 Assembly and Orientation of Lamp Housing

Section 13-2 Adjustment of VASI Power and Control Assembly

DIVISION 14. CONVEYING SYSTEMS

Not Used

DIVISION 15. MECHANICAL

Not Used

DIVISION 16. ELECTRICAL

Section 16-1	General
Section 16-2	Applicable Documents
Section 16-3	Materials and Equipment
Section 16-4	Approval of Materials and Equipment
Section 16-5	Installation
Section 16-2	Tests

\* \* \* \* \*

DIVISION 1. GENERAL REQUIREMENTS

1-1 Summary of Work

1-1.1 Scope.- This specification covers the requirements for the construction of a Visual Approach Slope Indicator (VASI).

1-1.2 Types.- Two types of facilities are covered by this specification

4 Box VASI System

6 Box VASI System

1-2 General requirements

1-2.1 Work to be accomplished by the contractor.- The contractor shall furnish all plant, labor and material as required to construct the facility in accordance with these specifications and the applicable drawings.

1-2.2 Safety requirement.- The contractor shall comply with the safety precautions as required by the local airport authority or deemed necessary by the Contracting Officer. This may include, but not be limited to, use of airport flags, two-way radios, and lights.

1-2.3 Clean-up and repair.- The contractor shall correct or replace any damage done during any part of this contract. Scrap and debris resulting from construction and installation shall be removed from the premises by the contractor. The contractor shall obtain and transmit to the Contracting Officer a letter from the Airport Manager stating that all work areas located on the airport were left in a satisfactory condition.

DIVISION 2. SITE WORK

- 2-1 Excavation. - The excavation shall conform to the dimensions and elevations indicated for each structure. Excavation shall extend a sufficient distance from the piers to allow for the placing and removal of forms, except where concrete for the piers is authorized to be deposited directly against excavated surfaces. Excavation below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed by the Contracting Officer and replaced with satisfactory material; payment therefor will be in conformance with the CHANGES clause of the GENERAL PROVISIONS. Material removed below the depths indicated without specific direction of the Contracting Officer or Authorized Representative shall be replaced with concrete at no additional cost to the Government.
- 2-2 Backfill. - Backfilling shall not begin until construction below finish grade has been approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to finish grade. Backfill material adjacent to foundation walls shall be deposited in 6-inch-maximum thickness layers, properly moistened and thoroughly consolidated by power operated mechanical equipment to 90% maximum density at optimum moisture content. Backfill material shall be clean earth, free from perishable material and debris. Backfill shall not be placed around foundation walls prior to seven days after completion of the walls.
- 2-3 Aggregate for fill and walkways
- 2-3.1 Applicable Document. - The following Federal Specification currently in force forms a part of this section as specified herein.
- SS-A-281 Aggregate; for Portland Cement-Concrete
- 2-3.2 Material. - Coarse fill under concrete slabs and for walkways shall be clean hard gravel, broken stone or slab, and shall comply with Federal Specification SS-A-281, Class 2, sized from #4 to 2 inches.
- 2-4 Reconditioning surface. - Any excess excavated material shall be removed and disposed of in accordance with instructions from the Contracting Officer. After backfilling, the surface shall be left free from ruts and rough spots, and shall be restored to its original level and condition. In cultivated areas, sod or top soil shall be carefully preserved and replaced by sod of quality equal to that removed. Where disturbed surface is a newly seeded area, the restored surface shall be reseeded with the same quantity and formula of seed as that used in the original seeding.

## DIVISION 3. CONCRETE

3-1 General. - This division covers concrete work, complete.

3-2 Applicable documents. - The following specifications and standards of the issues currently in force, form a part of this section and are applicable as specified herein.

3-2.1 Federal Specifications.

SS-A-281 Aggregate; (for) Portland-Cement-Concrete  
SS-C-192 Cement, Portland

3-2.2 American Concrete Institute (ACI) Standards.

ACI 306 Recommended Practice for Cold Weather Concreting

ACI 318 Building Code Requirements for Reinforced Concrete

ACI 605 Recommended Practice for Hot Weather Concreting

3-2.3 American Society for Testing and Materials (ASTM) Publications.

A 615 Deformed Billet Steel Bars for Concrete Reinforcement

C 31 Making and Curing Concrete Compression and Flexure Test Specimens in the Field

C 39 Compressive Strength of Molded Concrete Cylinders

C 94 Ready-mixed Concrete

C 143 Slump of Portland Cement Concrete

C 192 Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory.

3-3 Materials.

3-3.1 Aggregate. - Aggregate shall conform to Federal Specification SS-A-281, Classes 1 and 2.

3-3.2 Portland cement. - Portland Cement shall conform to Federal Specification SS-C-192, type I or type II.

3-3.2.1 High-early-strength Portland Cement. - High-early-strength Portland Cement shall conform to Federal Specification SS-C-192, Type III.

3-3.3 Forms. - Forms shall be wood, plywood, metal, or other approved material, and shall be of the grade or type suitable to obtain the kind of finish required.

3-3.4 Reinforcing steel.- Reinforcing steel shall conform to ASTM A 615 grade 40.

3-3.5 Water.- Water shall be clean, fresh, and free from injurious amounts of mineral and organic substances.

3-4 Sample Testing.-

3-4.1 General.- Testing of end items (cylinders) is the responsibility of the Government. Samples of concrete for strength tests of end items shall be provided and stored as directed.

3-4.2 Concrete cylinders.- The contractor shall provide for test purposes one set of three cylinders taken for each day's pour. The test cylinders shall be made in accordance with ASTM C 31, and will be tested in accordance with ASTM C 39. Any deficiency which occurs in concrete in place shall be corrected in a manner approved by the Contracting Officer and at no additional cost to the Government.

3-5 Forms.- Forms shall be constructed to the shape, form, line and grade required, and shall be maintained sufficiently rigid to prevent deformation under load.

3-6 Reinforcing steel.- Metal reinforcement shall be free from rust, scale or other coatings, and shall be accurately placed and properly secured in position by concrete blocks or metal chairs, spacers and tie wires.

3-7 Concrete.- Concrete shall be proportioned and mixed for minimum allowable compressive strength at 28 days of 3000 pounds per square inch. Concrete made with high-early-strength cement shall have a compressive strength at 7 days of 3000 pounds per square inch.

3-7.1 Proportioning of concrete mixes.- Proportioning of concrete mixes shall be by weight.

3-7.1.1 Measurements

3-7.1.1.1 Cement.- A one-cubic-foot bag of Portland cement will be considered as 94 pounds in weight.

3-7.1.1.2 Water.- One gallon of water will be considered as 8.33 pounds.

3-7.1.1.3 Aggregate.- Fine and coarse aggregate shall be measured by weight in accordance with Federal Specification SS-A-281. Coarse aggregate shall be used in the greatest amount consistent with required workability.

### 3-7.1.2 Control

- 3-7.1.2.1 Determination of maximum water content allowable.- The strength quality of the concrete proposed for use shall be established by tests made in advance of the beginning of operations, or by certification of an approved concrete company. Trial design batches, testing and/or certification shall be the responsibility of the Contractor. Specimens shall be made and cured in accordance with ASTM C 192, and will be tested in accordance with ASTM C 39.
- 3-7.1.3 Slump Test.- In the field, consistency shall be determined in accordance with ASTM C 143. Slump for vibrated concrete shall be 2 to 3 inches.
- 3-7.2 Job mixed concrete.- Concrete mixed at the job site shall be mixed in a batch mixer in accordance with American Concrete Institute Standard ACI 318, and in a manner subject to approval.
- 3-7.3 Ready-mixed concrete.- Ready-mixed concrete may be used at the option of the Contractor. Ready-mixed concrete shall conform to ASTM 94 except that concrete which has contained its mixing water longer than 90 minutes shall not be placed.
- 3-7.3.1 Delivery tickets.- Delivery tickets showing the mix proportions of the concrete shall be available for review by the Contracting Officer's representative prior to depositing the concrete.
- 3-7.4 Preparation for placing.- Water shall be removed from excavation before concrete is deposited. Hardened concrete, debris, and other foreign materials shall be removed from the interior of forms and from the inside of mixing and conveying equipment. The reinforcing shall be made secure in position, and shall be subject to inspection and approval.
- 3-7.5 Placing concrete.- Unless otherwise specified, placing of concrete shall conform to Chapter 6 of American Concrete Institute Standard ACI 318. Concrete having attained initial set or having contained water for more than 90 minutes shall not be used in the work. During cold weather, mixing and placing of concrete shall conform to the recommendations of ACI 306. During hot weather, mixing and placing of concrete shall conform to the recommendations of ACI 605. Concrete footings shall be placed only upon surfaces that are free from frost, ice, mud, and loose or unsound rock, and other detrimental substances. When placed on dry soil or pervious material, waterproof paper shall be laid over surfaces that are to receive the concrete.
- 3-7.6 Consolidation.- Concrete shall be placed in layers not over 12 inches deep. Each layer shall be consolidated by mechanical internal-vibrating equipment, supplemented by hand spading, rodding, and tamping as directed.

3-7.7 Slabs On Grade.

3-7.7.1 Placement.- Concrete shall be deposited to the required thickness, consolidated, screeded to grade, and prepared for the specified finish.

3-7.7.2 Finish.- Concrete shall be finished monolithically to a smooth level surface by floating and troweling.

3-7.8 Curing.- Immediately after placing or finishing, concrete surfaces not covered by forms shall be protected against moisture loss for not less than 7 days.

## DIVISION 5. MISCELLANEOUS METALWORK

- 5-1 General. - This division covers miscellaneous metalwork, complete.
- 5-2 Applicable documents. - The following specifications and standards, of the issues currently in force, form a part of this specification and are applicable as specified herein:

5-2.1 Federal Specifications

FF-B-588	Bolt, Toggle; and Expansion Sleeve, Screw
FF-H-00111	Hardware, Builder's; Shelf and Miscellaneous
FF-S-325	Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)

5-2.2 American Society for Testing and Materials (ASTM) Publications.

A 123	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
-------	--

- 5-3 Materials. - Materials shall conform to the requirements specified for the particular item; and where these requirements are not specified in detail, the materials shall be suitable for the intended usage of the item. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Miscellaneous bolts and anchors, supports, braces, and connections necessary for completion of the miscellaneous metalwork shall be provided.
- 5-4 Workmanship. - Miscellaneous metalwork shall be well formed to shape and size. Work shall be accurately set to established lines and elevations and securely fastened in place.

DIVISION 13. SPECIAL CONSTRUCTION

13-1 Assembly and Orientation of Lamp Housing

13-1.1 General. - The following procedures shall be applied in the assembly and orientation of lamp housings.

- a. Bring end of lower cable assembly through coupling of power input leg. Assemble cable clamp around female plug and seat cable clamp against nipple in coupling.
- b. Thread male plug and upper cable assembly through collar assembly, length of 2" EMT and frangible coupling and plug cable into female connector. Screw in frangible coupling against clamp. Insert EMT into frangible coupling and tighten compression nut, lift post caps and let down over EMT pulling cable through loosely so as not to break connection in frangible coupling. Revolve post cap so that bar is at right angles to runway.
- c. Assemble frangible couplings to four base leg flanges. Cut four pieces of 2" EMT to length. Assemble to frangible couplings and tighten compression nuts with the two front leg mounting brackets in 0° mounting hole of unit and with all adjustment nuts tightened on brackets at midpoint of travel, assemble EMT to leg caps and tighten leg cap compression nuts.
- d. Lift VASI unit with four legs attached over foundations and power input leg with post cap. Thread upper cable assembly through opening in unit and seat unit on concrete foundation.
- e. Locate unit on foundation so that front face of unit is facing the threshold and is at 90° to the runway centerline. Lift post caps and bolt to bottom of unit.
- f. With unit located spot and drill holes for anchoring floor flanges. Secure unit to foundation and connect upper cable assembly to terminal board in each unit. Dress excess cable neatly to bottom of unit with cable clip.
- g. For elevation of VASI indicator units by leg adjustments and for aiming of units to glide slope angles, see the manufacturer's instructions.

13-2 Adjustment of VASI power and control assembly.

13-2.1 General. - Each power and control assembly shall be adjusted as follows to compensate for voltage drops due to variations in loop lengths.

13-2.2 Energizing system. - Before energizing system:

1. Set sliders on all resistors at minimum resistance (shortened out completely).
2. Set each tap switch for lowest output current (highest input voltage tap).
3. Energize the system at high brightness and check currents in both legs at each assembly. Current should be less than 6.6 amperes.
4. Add resistance in leg with highest current until current drops to equal that of the low leg. De-energize while change is being made.
5. Adjust both assemblies in similar fashion.
6. Cover photo cell to cause system to run at low brightness and similarly adjust the low brightness resistors in each assembly.
7. Uncover photo cell and adjust the tap switches of each assembly until current rises to  $6.4 \pm$  amperes ( $\pm 0.2$  ampere) in each of the four loops. All measurements of current shall be made with iron vane ammeters.

## DIVISION 16. ELECTRICAL

16-1 General. - This division covers electrical work, complete.

16-1.1 Rules. - The installation shall conform to the applicable rules of the National Electrical Code and National Electrical Safety Code.

16-2 Applicable documents. - The following specifications and standards of the issues currently in force, form a part of this section, and are applicable as specified herein:

### 16-2.1 Federal Specification

J-C-30	Cable and Wire, Electrical ( Power, Fixed Installation)
L-T-75	Tape, Pipe-Coating; Pressure-Sensitive; Polyethylene
TT-W-570	Wood Preservative; Pentachlorophenol, Solid
TT-W-571	Wood Preservative; Treating Practice
W-F-406	Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible
W-F-408	Fittings for Conduit, Metal, Rigid (Thick-Wall and Thin-Wall (EMT) Type)
W-S-610	Splice, Conductor
WW-C-563	Conduit, Metal Rigid; ...Thin Wall Type (EMT)
WW-C-581	Conduit, Metal, Rigid; and Coupling, Elbow and Nipple, Electrical Conduit; Zinc Coated

### 16-2.2 National Bureau of Standards Handbook

H 30 National Electrical Safety Code

### 16-2.3 American Society for Testing and Materials (ASTM) Standards

D 752	Heavy-Duty Black Neoprene Sheath for wire and Cable
C 1679	Synthetic Rubber Heat - and Moisture - Resisting Insulation for Wire and Cable, 75°C Operation

### 16-2.4 National Electrical Manufacturer's Association (NEMA) Standards

### 16-2.5 Insulated Power Cable Engineers Association

S-19-81-69	Rubber Insulated Wire and Cable
S-66-524-71	Cross Linked Polyethylene for Power Cable

16-2.6 American National Standards Institute (formerly American Standards Association)

ASA 05.1 Specifications and Dimensions for Wood Poles

16-2.7 National Fire Protection Association

VOL. 5 National Electrical Code

16-2.8 Federal Aviation Administration

AC 150/5345-26A Specification for L-823 Plug and Receptacle, Cable Connectors

FAA-E-113 Poles, Wood, Treated

FAA-C-1391 Installation and Splicing of Underground Cable

FAA-D-2013 Cable, Electrical, Power, 600 to 15,000 Volts

16-3 Materials and equipment.- Materials and equipment shall be as specified elsewhere herein and as shown on the drawings and shall be the products of manufacturers regularly engaged in the manufacture of such products.

16-3.1 Conduit.- Rigid steel conduit shall be used throughout except where electric metallic tubing is indicated on the drawings for the lamp housing supports.

16-3.2 Conductors.- Conductors shall be copper, type RHW or THW. All conductors shall be rated 600 volts.

16-4 Approval of Materials and Equipment.- Approval of materials and equipment will be based on the manufacturer's published data.

16-4.1 Label or listing.- The label or listing of Underwriter's Laboratories, Inc., will be accepted as evidence that the materials or equipment conforms to the applicable standards of that agency.

16-5 INSTALLATION

16-5.1 Conduit.

16-5.1.1 Rigid Steel Conduit.- Rigid steel conduits conforming to Federal Specification WW-C-581 shall be used throughout except where otherwise shown on the drawings or permitted by these specifications.

16-5.1.2 Electric metallic tubing.- Electric metallic tubing shall be used for supports for the VASI lamp housing units.

- 16-5.1.3 Conduits below slab-on-grade or in ground.- Conduits below slab-on-grade or in ground shall be rigid steel. Steel conduits installed below slab-on-grade or in the ground shall be field-wrapped with a 0.010-inch thick pipe-wrapping plastic tape applied with a 50 percent overlap, or shall have a factory applied coating with a minimum thickness not less than one of the following:

Low-density or medium density plastic	0.020 inch
Epoxy resin	0.008 inch
Coal-tar enamel	0.063 inch

Zinc coating may be omitted from steel conduit which has a factory-applied epoxy-resin coating. Field made joints, fittings, abrasions, and coating holidays shall be coated with material equivalent to material specified above.

- 16-5.2 Cable.- Wherever possible, cable shall be run in one piece, without splices, from connection to connection. The number of splices shall be kept to a minimum. Where cable cutting is required, cable ends shall be effectively sealed against moisture immediately after cutting.

- 16-5.2.2 Direct earth burial.- Installation of direct earth burial cable, including trenching excavation, backfilling, and restoration of area, shall be in accordance with Specification FAA-C-1391.

- 16-5.2.2.1 Cable markers.- Location of cable runs shall be marked by pre-cast concrete slab markers, in accordance with Specification FAA-C-1391.

- 16-5.3 Grounding.- All exposed noncurrent-carrying metallic parts of the electrical system, including conduit system, and neutral conductor of the wiring system shall be grounded as shown and as required by the National Electrical Code. The grounding conductor shall be green color coded or bare and sized as indicated. Grounding lugs, connectors and other components shall comply with the National Electrical Code.

- 16-5.3.1 Ground electrode rods.- Ground rods shall be of copper-clad steel not less than 3/4 inch in diameter, 10 feet long, driven full length into the earth.

- 16-5.4 Splicing.- Conductors shall be spliced or joined with splicing devices suitable for the use. All splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an insulating device suitable for the purpose. All cable runs shall be given a ground resistance test and continuity check at the completion of each splice throughout the length of the cable run.

16-6 TEST

- 16-6.1 Cable testing.- Testing shall be performed in accordance with Specification FAA-C-1391.
- 16-6.2 Operating test.- After the installation has been completed, and at such time as the Contracting Officer's representative may direct, the Contractor shall conduct an operations test for approval. The equipment shall be demonstrated to operate in accordance with the design. The Contractor shall furnish the necessary instruments and personnel required for the test, and the Government will furnish the necessary electrical power.

\* \* \* \* \*